

CLAIMS

What is claimed is:

1. A private wireless network, to which private network mobile stations subscribe, integrated with a public wireless network, to which public network mobile stations subscribe, said private wireless network being able to provide wireless telecommunications services to at least one mobile station that subscribes to said private wireless network and to said public wireless network, said public wireless network having a public network subscriber database containing a public network data record for each of said public network mobile stations, including a first data record for said at least one mobile station, said private wireless network comprising:

at least one base station providing a private network coverage area, said at least one mobile station being able to communicate with said at least one base station over an air interface when said at least one mobile station is operating in said private network coverage area;

a switching system in communication with said at least one base station; and

a private network subscriber database accessible by said switching system, said private network subscriber database containing a private network data record for each of said private network mobile stations, including a second data record for said at least one mobile station.

2. The private wireless network of claim 1, further comprising a gateway service control point (SCP) in communication with said switching system.

3. The private wireless network of claim 2, wherein said private network subscriber database is located in said gateway SCP.

4. The private wireless network of claim 3, wherein said public network subscriber database is located in a home location register (HLR).

5. The private wireless network of claim 3, wherein said first data record includes a first locator address for locating said at least one mobile station and said second data record includes a second locator address for locating said at least one mobile station.

6. The private wireless network of claim 5, wherein said first locator address identifies said gateway SCP and said second locator address identifies said switching system.

5 7. The private wireless network of claim 3, wherein said SCP includes a plurality of service logic modules.

8. The private wireless network of claim 4, wherein said HLR includes a plurality of service logic modules.

10 9. The private wireless network of claim 3, wherein said switching system includes a first mobile switching center (MSC).

15 10. The private wireless network of claim 9, wherein said switching system includes a second MSC.

11. The private wireless network of claim 9, wherein said switching system includes a first private branch exchange (PBX).

20 12. The private wireless network of claim 11, wherein first PBX communicates with said gateway SCP via a computer telephony interface (CTI).

13. The private wireless network of claim 11, wherein said switching system includes a second PBX.

25 14. The private wireless network of claim 1, wherein said first data record includes a first service profile for said at least one mobile station and said second data record includes a second service profile for said at least one mobile station.

30 15. The private wireless network of claim 14, wherein said first service profile differs from said second service profile.

16. The private wireless network of claim 1, wherein said public wireless network provides a public network coverage area within which said at least one mobile station can communicate with said public wireless network over an air interface, said private network wireless coverage area overlapping said public network coverage area.

17. A method for mobility management of a mobile station, said mobile station subscribing to a private wireless network and to a public wireless network, said private wireless network having a base station, said base station being able to communicate with said mobile station over an air interface, a switching system in communication with said base station, a gateway in communication with said switching system, a private network database accessible by said gateway, said private network database containing a first data record for said mobile station, said public wireless network having a home location register, said home location register including a public network database, said public network database containing a second data record for said mobile station, said method comprising the steps of:

said mobile station transmitting a registration request message to said base station over said air interface;

said gateway receiving a first registration notification message, said first registration notification message identifying said mobile station; and

said gateway transmitting a second registration notification message to said home location register, said second registration notification message identifying said mobile station.

18. The method of claim 17, further comprising the step of:

in response to receiving said first registration notification message, said gateway providing said private network database with a first locator address for said mobile station, said first locator address corresponding to said switching system; and

said private network database updating said first data record with said first locator address.

19. The method of claim 17, further comprising the steps of:

said home location register receiving said second registration notification message; and

in response to receiving said second registration notification message, said home location register providing said public network database with a second locator address for said mobile station; and

5 said public network database updating said second data record with said second locator address.

20. The method of claim 19, wherein said second locator address corresponds to said gateway.

10 21. The method of claim 20, further comprising the steps of:

in response to receiving said second registration notification message, said home location register providing said public network database with a short message system address for said mobile station; and

15 said public network database updating said second data record with said short message system address.

22. The method of claim 21, wherein said short message system address corresponds to said switching system.

20 23. The method of claim 17, further comprising the step of:

said gateway obtaining from said private network database a first service profile for said mobile station.

24. The method of claim 23, further comprising the step of:

25 said gateway receiving a second service profile from said home location register for said mobile station.

25. The method of claim 24, further comprising the step of:

30 said gateway reconciling said first and second service profiles to obtain a working service profile for said mobile station.

26. The method of claim 17, further comprising the steps of:
said mobile station transmitting a de-registration request message to said base station
over said air interface;

5 said gateway receiving a first de-registration notification message, said first de-
registration notification message identifying said mobile station; and
said gateway transmitting a second de-registration notification message to said home
location registration, said second de-registration notification message identifying said mobile
station.

10 27. The method of claim 26, further comprising the step of:
in response to receiving said first de-registration notification message, said gateway
notifying said private network database that said mobile station is inactive; and
said private network database updating said first data record to indicate that said mobile
station is inactive.

15 28. The method of claim 26, further comprising the steps of:
said home location register receiving said second de-registration notification message;
and
in response to receiving said second de-registration notification message, said home
20 location register updating said second data record to indicate that said mobile station is inactive.

25 29. A method for handing off a mobile station being served by a serving system in a
private wireless network to a target system in a public wireless network, said public wireless
network having a home location register, said home location register including a public network
subscriber database, said public network subscriber database containing a first data record for
said mobile station, said first data record including a first locator address for locating said mobile
station, said private wireless network having a gateway in communication with said serving
system and a private network subscriber database accessible by said gateway, said private
network subscriber database containing a second data record for said mobile station, said second
30 data record including a second locator address for locating said mobile station, said second
locator address identifying said serving system, said method comprising the steps of:

said home location register receiving a registration notification message from said target system, said registration notification message identifying said mobile station; and

said home location register transmitting a first registration cancellation message to said gateway, said first registration cancellation message identifying said mobile station.

30. The method of claim 29, further comprising the step of:
said public network subscriber database updating said first data record so that said first locator address identifies said target system.

31. The method of claim 30, further comprising the step of:
said private network subscriber database updating said second data record so that said second locator address no longer identifies said serving system.

32. The method of claim 31, further comprising the step of:
said gateway transmitting a second registration cancellation message to said serving system, said second registration cancellation message identifying said mobile station.

33. The method of claim 29, wherein said target system includes a public network mobile switching center (MSC), said public network MSC having a public network visitor location registration (VLR).

34. The method of claim 29, wherein said serving system includes a private network mobile switching center (MSC), said private network MSC having a private network visitor location registration (VLR).

35. A method for handing off a mobile station being served by a serving system in a public wireless network to a target system in a private wireless network, said public wireless network having a home location register, said home location register including a public network subscriber database, said public network subscriber database containing a first data record for said mobile station, said first data record including a first locator address for said mobile station, said first locator address identifying said serving system, said private wireless network having a

gateway in communication with said serving system and a private network subscriber database accessible by said gateway, said private network subscriber database containing a second data record for said mobile station, said second data record including a second locator address for locating said mobile station, said method comprising the steps of:

5 said gateway receiving a first registration notification message from said target system, said first registration notification message identifying said mobile station; and

 said gateway transmitting a second registration notification message to said home location register, said second registration notification message identifying said mobile station.

10 36. The method of claim 35, further comprising the step of:

 said public network subscriber database updating said first data record so that said first locator address identifies said gateway.

 37. The method of claim 36, further comprising the step of:

15 said private network subscriber database updating said second data record so that second locator address identifies said target system.

 38. The method of claim 37, further comprising the step of:

20 said home location register transmitting a registration cancellation message to said serving system, said registration cancellation message identifying said mobile station.

 39. The method of claim 35, wherein said target system includes a private network mobile switching center (MSC), said private network MSC having a private network visitor location registration (VLR).

25 40. The method of claim 35, wherein said serving system includes a public network mobile switching center (MSC), said public network MSC having a public network visitor location registration (VLR).

30 41. A method for delivering a voice mail indication to a mobile station that subscribes to a private wireless network and to a public wireless network, said private wireless network having

a gateway and a computer telephony interface (CTI) in communication with said gateway, said gateway including a private network subscriber database, said private network subscriber database containing a first data record for said mobile station, said private wireless network having a private network serving system for serving said mobile station when said mobile station is operating in a private network wireless coverage area, said public wireless network having a home location register, said home location register including a second data record for said mobile station, said public wireless network having a public network serving system for serving said mobile station when said mobile station is operating in a public network wireless coverage area, said method comprising the steps of:

10 said CTI transmitting a first voice mail notification message to said gateway, said first voice mail notification message identifying said mobile station;

 if said mobile station is operating in said private network wireless coverage area, said gateway transmitting a second voice mail notification message to said private network serving system, said second voice mail notification message identifying said mobile station; and

15 in response to receiving said second voice mail notification message, said private network serving system causing a first voice mail indication to be transmitted to said mobile station.

42. The method of claim 41, wherein said first data record includes a first locator address identifying said private network serving system.

43. The method of claim 41, wherein said private network serving system includes a private network mobile switching center (MSC).

25 44. The method claim 41, further comprising the steps of:

 if said mobile station is operating in said public network coverage area, said gateway transmitting a third voice mail notification message to said home location register, said third voice mail notification message identifying said mobile station;

 in response to receiving said third voice mail notification message, said home location register transmitting a fourth voice mail notification message to said public network service system; and

in response to receiving said fourth voice mail notification message, said public network serving system causing a second voice mail indication to be transmitted to said mobile station.

45. The method of claim 44, wherein said second data record includes a second locator address identifying said public network serving system.

46. The method of claim 44, wherein said public network serving system includes a public network mobile switching center (MSC).

47. The method of claim 41, wherein said private wireless network includes a private branch exchange (PBX), said PBX having access to a voice mail system, further comprising the step of:

in response to said voice mail system receiving a voice mail message, said PBX transmitting an initial voice mail notification message to said CTI.

48. The method of claim 47, wherein said PBX is connected to a wireline station provided with a voice mail indicator, further comprising the step of:

in response to said voice mail system receiving a voice mail message, said PBX activating said voice mail indicator on said wireline station.

49. A method for providing call origination services to a mobile station that subscribes to a private wireless network and to a public wireless network, said private wireless network having a private network serving system for serving said mobile station when said mobile station is operating in a private network wireless coverage area, said public wireless network having a public network serving system for serving said mobile station when said mobile station is operating in a public network wireless coverage area, said private wireless network having a first service control point (SCP), said public wireless network having a second service control point (SCP), said method comprising the steps of:

if said mobile station is operating in said private network wireless coverage area:

said private network serving system transmitting a first call origination query to said first SCP;

said first SCP transmitting a second call origination query to said second SCP;
said second SCP executing service logic to formulate first call processing instructions;
said second SCP transmitting to said first SCP a first response message containing said first call processing instructions; and
said first SCP transmitting to said private network serving system a second response message containing said first call processing instructions.

50. The method of claim 49, further comprising the steps of:

if said mobile station is operating in said public network wireless coverage area:

said public network serving system transmitting a third call origination query to said second SCP;
said second SCP executing service logic to formulate second call processing instructions; and
said second SCP transmitting to said public network serving system a third response message containing said second call processing instructions.

51. A method for providing call termination services to a mobile station that subscribes to a private wireless network and to a public wireless network, said private wireless network having and a mobile switching center (MSC) and a first service control point (SCP), said public wireless network having a second SCP, said method comprising the steps of:

in response to receiving a request to terminate a call to said mobile station, said MSC transmitting a first call termination query to said first SCP;

said first SCP transmitting a first response message to said MSC, said first response message identifying said second SCP;

said MSC transmitting a second call termination query to said second SCP;
said second SCP executing service logic to formulate call processing instructions; and
said second SCP transmitting a second response message to said MSC, said second response message containing said call processing instructions.

52. A method for updating at least one telecommunications feature available to a mobile station that subscribes to a private wireless network and to a public wireless network, said private wireless network having a private network serving system for serving said mobile station when said mobile station is operating in a private network wireless coverage area, said public wireless network having a public network serving system for serving said mobile station when said mobile station is operating in a public network wireless coverage area, said private wireless network having a gateway service control point (SCP), said gateway SCP including a private network subscriber database, said private network subscriber database containing a first service profile for said mobile station, said public wireless network having a home location register (HLR), said HLR including a public network subscriber database, said public network subscriber database containing a second service profile for said mobile station, said method comprising the steps of:

said mobile station transmitting a signal containing a feature code; and

if said mobile station is operating in said private network wireless coverage area:

said private network serving system transmitting a first feature request message to said gateway SCP;
said gateway SCP updating said first service profile for said mobile station;
said gateway SCP transmitting a second feature request message to said HLR; and
said HLR updating said second service profile for said mobile station.

53. The method of claim 52, further comprising the steps of:

if said mobile station is operating in said public network wireless coverage area:

said public network serving system transmitting a third feature request message to said HLR;
said HLR updating said second service profile for said mobile station;
said HLR transmitting a fourth feature request message to said gateway SCP; and
said gateway SCP updating said first service profile for said mobile station.